

1. *Chlorophyll a* (Chl *a*) and *Chlorophyll b* (Chl *b*) were determined using the method of Arar and Collins (1987). The *Chlorophyll a* and *Chlorophyll b* concentrations were determined using a spectrophotometer (Shimadzu UV-160U) at 663 nm and 646 nm, respectively. The total chlorophyll concentration was calculated as the sum of Chl *a* and Chl *b*.

What is claimed is:

101

1. A self-hardening bioceramic composition, comprising:
a calcium phosphate and an aqueous-based liquid in an amount sufficient to hydrate the calcium phosphate to form a paste or putty, wherein the said paste or putty hardens and the hardening is associated with an endothermic reaction.

5

2. The self-hardening bioceramic composition of claim 1, wherein the said paste or putty remains injectable or formable for a time greater than about 30 minutes at about 22 °C, and hardens within about 10 to 60 minutes at about 37 °C.

10

3. The composition of claim 2, wherein hardening occurs in more than 30 minutes.

15

4. The composition of claim 1, wherein the aqueous-based fluid is selected from the group consisting of water, a physiologically acceptable pH-buffered solution, saline solution, serum and tissue culture medium.

20

5. The composition of claim 1 or 2, wherein the calcium phosphate comprises an amorphous calcium phosphate.

6. The composition of claim 1 or 2, wherein the calcium phosphate comprises a nanocrystalline calcium phosphate.

25

7. The composition of claim 1 or 2, wherein the hardening of the hydrated precursor is further associated with the conversion of the calcium phosphate into a poorly crystalline apatitic calcium phosphate.

30

8. The composition of claim 7, further comprising a promoter, said promoter further capable of promoting the conversion of calcium phosphate into a poorly crystalline apatitic calcium phosphate.

9. The composition of claim 8, wherein the promoter is selected from

the group consisting of passive promoters and participant promoters.

10. The composition of claim 9, wherein the promoter is a passive promoter selected from the group consisting of metals, metal oxides, ceramics, silicates, sugars, salts, and polymeric particulates

11. The composition of claim 9, wherein the promoter is a passive promoter and said passive promoter is present in the range of about 1:1 to about 5:1 calcium phosphate:promoter.

12. The composition of claim 9, wherein the promoter is a passive promoter selected from the group consisting of SiO_2 , mica, Al_2O_3 , poly(L-lactide) (PLLA), polyglycolide (PGA), and poly(lactide-co-glycolide) (PLGA) copolymers.

13. The composition of claim 9, wherein the promoter is a participant promoter selected from the group consisting of calcium and phosphorus sources.

14. The composition of claim 9, wherein the promoter is a participant promoter selected from the group consisting of calcium metaphosphate, dicalcium phosphate dihydrate, heptacalcium decaphosphate, tricalcium phosphates, calcium pyrophosphate dihydrate, crystalline hydroxyapatite, PCA calcium phosphate, calcium pyrophosphate, monetite, octacalcium phosphate, CaO , CaCO_3 , calcium acetate, and H_3PO_4 , and ACP.

15. The composition of claim 9, wherein the promoter comprises DCPD.

16. The composition of claim 9, wherein the promoter comprises DCPD having an average grain size less than about $200\mu\text{m}$.

17. The composition of claim 9, wherein the promoter comprises DCPD having an average grain size of less than about $95\mu\text{m}$.